What is claimed is:

1. An electromagnetic radiation immune sensing system, comprising:

a photonic lead having a proximal end and a distal end;

a light source, in the proximal end of said photonic lead, to produce a first light having a first wavelength and a second light having a second wavelength;

a wave-guide between the proximal end and distal end of said photonic lead;

a bio-sensor, in the distal end of said photonic lead, to measure changes in an electric field located outside a body, the electric field being generated by the shifting voltages on a body's skin surface; and

a distal sensor, in the distal end of said photonic lead, to convert the first light into electrical energy and, responsive to said bio-sensor, to reflect the second light back the proximal end of said photonic lead such that a characteristic of the second light is modulated to encode the measured changes in the electric field.

2. The electromagnetic radiation immune sensing system as claimed in claim 1, further comprising:

a proximal sensor, in the proximal end of said photonic lead, to convert the modulated second light into electrical energy.

3. The electromagnetic radiation immune sensing system as claimed in claim 2, further comprising:

a transmitter, in the proximal end of said photonic lead and operatively connected to said proximal sensor, to transmit, in response the electrical energy from the converted modulated second light, information representing the measured changes in the electric field.

4. The electromagnetic radiation immune sensing system as claimed in claim 1, wherein said light source includes a first emitter to emit the first light having the first wavelength and a second emitter to emit the second light having the second wavelength.

5. The electromagnetic radiation immune sensing system as claimed in claim 1, wherein said light source includes a first laser to produce the first light having the first wavelength and a second laser to produce the second light having the second wavelength.

6. The electromagnetic radiation immune sensing system as claimed in claim 1, wherein said distal sensor includes:

an optical attenuator coupled to a mirror; and

an optical-electrical conversion device to convert the first light into electrical energy;

said optical attenuator attenuating the second light to encode the measured changes in the electric field.

7. The electromagnetic radiation immune sensing system as claimed in claim 6, wherein said optical attenuator attenuating the second light to create pulses of light having equal intensity and periods of no light, the

periods of no light differing in time in response to the measured changes in the electric field.

8. The electromagnetic radiation immune sensing system as claimed in claim 6, wherein said optical attenuator attenuating the second light to create light having differing intensities over a period of time.

9. The electromagnetic radiation immune sensing system as claimed in claim 6, further comprising:

a beam splitter to direct the second light to said optical feedback device and to direct said first light to said optical-electrical conversion device.

10. The electromagnetic radiation immune sensing system as claimed in claim 6, wherein said optical attenuator comprises liquid crystal material having a variable optical transmission density responsive to applied electrical voltage.

11. The electromagnetic radiation immune sensing system as claimed in claim 1, wherein said distal sensor includes:

a variable reflectance optical reflector; and

an optical-electrical conversion device to convert the first light into electrical energy;

said variable reflectance optical reflector variably reflecting the second light to encode the measured changes in the electric field.

12. The electromagnetic radiation immune sensing system as claimed in claim 11, wherein said variable reflectance optical reflector variably reflecting the second light to create pulses of light having equal intensity and periods of no light, the periods of no light differing in time in response to the measured changes in the electric field.

13. The electromagnetic radiation immune sensing system as claimed in claim 11, wherein said variable reflectance optical reflector variably reflecting the second light to create light having differing intensities over a period of time.

14. The electromagnetic radiation immune sensing system as claimed in claim 11, further comprising:

a beam splitter to direct the second light to said variable reflectance optical reflector and to direct said first light to said optical-electrical conversion device.

15. The electromagnetic radiation immune sensing system as claimed in claim 1, wherein said distal sensor includes an optical-electrical conversion device to convert the first light into electrical energy and a variable reflectance optical reflector overlaying said optical-electrical conversion device;

said variable reflectance optical reflector variably reflecting the second light to encode the measured changes in the electric field and being optically transparent to said first light.

16. The electromagnetic radiation immune sensing system as claimed in claim 15, wherein said variable reflectance optical reflector variably reflecting the second light to create pulses of light having equal intensity and periods of no light, the periods of no light differing in time in response to the measured changes in the electric field.

17. The electromagnetic radiation immune sensing system as claimed in claim 15, wherein said variable reflectance optical reflector variably reflecting the second light to create light having differing intensities over a period of time.

18. The electromagnetic radiation immune sensing system as claimed in claim 1, wherein the measured electric field corresponds to an ECG signal.

19. The electromagnetic radiation immune sensing system as claimed in claim 1, wherein said bio-sensor has impedance higher than an impedance of an air gap between said bio-sensor and the body.

20. The electromagnetic radiation immune sensing system as claimed in claim 1, wherein said wave-guide is a fiber optic.

21. The electromagnetic radiation immune sensing system as claimed in claim 1, wherein said wave-guide includes a first fiber optic to transmit the first light and a second fiber optic to transmit the second light.

22. The electromagnetic radiation immune sensing system as claimed in claim 1, wherein said wave-guide is a bundle of fiber optics.

23. An electromagnetic radiation immune sensing system, comprising:

a photonic lead having a proximal end and a distal end;

a light source, in the proximal end of said photonic lead, to produce a first light having a first wavelength;

a wave-guide between the proximal end and distal end of said photonic lead;

a bio-sensor, in the distal end of said photonic lead, to measure changes in an electric field located outside a body, the electric field being generated by the shifting voltages on a body's skin surface; and

a distal sensor, in the distal end of said photonic lead, to convert the first light into electrical energy and, responsive to said bio-sensor, to emit a second light having a second wavelength to proximal end of said photonic lead such that a characteristic of the second light is modulated to encode the measured changes in the electric field.

24. The electromagnetic radiation immune sensing system as claimed in claim 23, further comprising:

a proximal sensor, in the proximal end of said photonic lead, to convert the modulated second light into electrical energy.

25. The electromagnetic radiation immune sensing system as claimed in claim 23, further comprising:

a transmitter, in the proximal end of said photonic lead and operatively connected to said proximal sensor, to transmit, in response the electrical energy from the converted modulated second light, information representing the measured changes in the electric field.

26. The electromagnetic radiation immune sensing system as claimed in claim 23, wherein said light source includes a laser to produce the first light having the first wavelength and said distal sensor includes a second laser to produce the second light having the second wavelength.

27. The electromagnetic radiation immune sensing system as claimed in claim 23, wherein said distal sensor includes:

an emitter to produce the second light having the second wavelength; and

an optical-electrical conversion device to convert the first light into electrical energy;

said emitter modulating the second light to encode the measured changes in the electric field.

28. The electromagnetic radiation immune sensing system as claimed in claim 27, wherein said emitter modulating the second light to create pulses of light having equal intensity and periods of no light, the periods of no light differing in time in response to the measured changes in the electric field.

29. The electromagnetic radiation immune sensing system as claimed in claim 27, wherein said emitter modulating the second light to create light having differing intensities over a period of time.

30. The electromagnetic radiation immune sensing system as claimed in claim 23, wherein said distal sensor includes:

an on-axis emitter to produce the second light having the second wavelength; and

an on-axis optical-electrical conversion device to convert the first light into electrical energy;

said on-axis emitter modulating the second light to encode the measured changes in the electric field.

31. The electromagnetic radiation immune sensing system as claimed in claim 30, wherein said on-axis emitter modulating the second light to create pulses of light having equal intensity and periods of no light, the periods of no light differing in time in response to the measured changes in the electric field.

32. The electromagnetic radiation immune sensing system as claimed in claim 30, wherein said on-axis emitter modulating the second light to create light having differing intensities over a period of time.

33. The electromagnetic radiation immune sensing system as claimed in claim 23, wherein said distal sensor includes:

an off-axis emitter to produce the second light having the second wavelength; and

an on-axis optical-electrical conversion device to convert the first light into electrical energy;

said off-axis emitter modulating the second light to encode the measured changes in the electric field.

34. The electromagnetic radiation immune sensing system as claimed in claim 33, wherein said off-axis emitter modulating the second light to create pulses of light having equal intensity and periods of no light, the periods of no light differing in time in response to the measured changes in the electric field.

35. The electromagnetic radiation immune sensing system as claimed in claim 33, wherein said off-axis emitter modulating the second light to create light having differing intensities over a period of time.

36. The electromagnetic radiation immune sensing system as claimed in claim 33, further comprising:

a beam splitter to direct the second light to said wave-guide and to direct said first light to said on-axis optical-electrical conversion device.

37. The electromagnetic radiation immune sensing system as claimed in claim 23, further comprising:

an on-axis proximal sensor, in the proximal end of said photonic lead, to convert the modulated second light into electrical energy.

38. The electromagnetic radiation immune sensing system as claimed in claim 23, further comprising:

an on-axis proximal sensor, in the proximal end of said photonic lead, to convert the modulated second light into electrical energy;

said light source being on-axis.

39. The electromagnetic radiation immune sensing system as claimed in claim 23, further comprising:

an off-axis proximal sensor, in the proximal end of said photonic lead, to convert the modulated second light into electrical energy.

40. The electromagnetic radiation immune sensing system as claimed in claim 23, further comprising:

an on-axis proximal sensor, in the proximal end of said photonic lead, to convert the modulated second light into electrical energy;

said on-axis proximal sensor being optically transparent to the first light.

41. The electromagnetic radiation immune sensing system as claimed in claim 23, wherein the measured electric field corresponds to an ECG signal.

42. The electromagnetic radiation immune sensing system as claimed in claim 23, wherein said wave-guide is a fiber optic.

43. The electromagnetic radiation immune sensing system as claimed in claim 23, wherein said wave-guide includes a first fiber optic to transmit the first light and a second fiber optic to transmit the second light.

44. The electromagnetic radiation immune sensing system as claimed in claim 23, wherein said wave-guide is a bundle of fiber optics.

45. The electromagnetic radiation immune sensing system as claimed in claim 23, wherein said bio-sensor has an impedance higher than an impedance of an air gap between said bio-sensor.